Low-Level Waste Overview of the Nevada Test Site Waste Disposal Operations – 8151

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ABSTRACT

This paper provides an overview and the impacts of new policies, processes, and opportunities at the Nevada Test Site (NTS). Operational changes have been implemented, such as larger trench sizes and more efficient soil management as have administrative processes to address U.S. Department of Energy and U.S. Code of Federal Regulation analyses. Some adverse conditions have prompted changes in transportation and mixed low-level waste polices, and a new funding mechanism was developed. This year has seen many changes to the NTS disposal family.

INTRODUCTION

The U.S. Department of Energy (DOE), National Nuclear Security Administration Nevada Site Office (NNSA/NSO) Environmental Management Program is responsible for the disposal of on-site and off-site generated low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) at the NTS. Over the last year, the LLW Sub-Project experienced several changes. However, there was no impact to the primary mission of accepting and disposing DOE's LLW and MLLW in a manner protective of the worker, public, and environment. This paper provides an overview and the impacts of new policies, processes, and opportunities at the NTS.

OPERATIONAL CHANGES

Area 5 Radioactive Waste Management Site Super Pit

Regardless of the terminology (cell, trench, pit, or waste site), disposal of LLW started in Area 5 on the NTS in 1953. Records indicate that early management of radioactive waste was

accomplished by erecting a fence around aboveground, contaminated debris. The first "cell" was excavated in 1961.

Disposal cell design and construction is based on several factors. These factors include, but not limited to, review of existing capacities compared to rate of consumption, current fiscal year actual waste volume received versus forecasted volume provided by DOE waste generators, five-year DOE generator forecasted volumes, and the availability of funds to construct new cells. Costs savings have been realized by reducing design drawing engineering costs and having the Area 5 disposal staff start pit excavation during slow receipt periods.

There is ample capacity within the Area 5 Radioactive Waste Management Site; however, the most recent disposal cell is designed using optimal disposal configurations and efficient cell construction methods. The new cell will be constructed to an optimum depth of 4.572 meters (15 feet) to accept the greatest variability of waste and container types. Additionally, the cell will be approximately twice the width than previously built cells allowing more flexibility in waste configurations.

Disposal of LLW in Permitted Units

Existing State of Nevada permits will be modified to allow LLW to be disposed in the MLLW and asbestos waste disposal cells. This effort will allow available capacity to be filled prior to scheduled closure.

Grading Activities

The NNSA/NSO will soon close a 92-acre area of the Area 5 Radioactive Waste Management Site. The cells within this area have operational covers that are approximately 1.2 meters (4 feet) above the natural grade. As part of maintenance activities, soil will be placed between the cells to bring them to grade with the disposal unit operational covers. This soil placement is not considered a closure activity.

The 92-acre area currently drains adequately, with the overall topographic slope of the area to the southwest. The placement of soil between disposal units will be sequenced to maintain the current drainage pattern and preclude ponding and infiltration of storm water into the waste zone. Until logistical and security issues can be resolved, some areas will not be brought to grade. Closure costs will be reduced by proactively bringing as much area as possible to grade while operations are ongoing.

Remote-Handled Waste Streams

Area 5 Radioactive Waste Management Site personnel have extensive experience receiving and disposing remote-handled waste using various types and sizes of cranes. Most recently, six (6) high-radiation waste containers (450 rem per hour at 30 centimeters maximum) were successfully offloaded and buried. The waste packages were removed from the Chem-Nuclear Systems Inc. CNS 1-13C shipping casks using a 149,685.5 kilogram crane (165 ton American

Crane), "nested" between lower radiation waste packages, and immediately covered with approximately 1.2 meters (4 feet) of soil in an effort to reduce the dose rates. A radiological work permit was developed and an As Low As Reasonably Achievable review was performed to minimize worker exposure. The health physics supervisor, using projected dose rates from the waste profile, estimated a collective dose of 600 millirem for the personnel directly involved in the operation. Upon completion of the project, electronic dosimeters revealed personnel received 112 millirem collectively, one third of the estimated dose. This is one of the many examples of how Disposal Operations successfully and safely handled and disposed of remote handled waste.

ADMINISTRATIVE POLICIES

The Cease Order and Its Impacts

The NNSA/NSO has stated there are no minor errors when dealing with LLW or MLLW disposal at the NTS. The Program continues to stress that errors by generators disrupt the DOE's entire radioactive waste disposal program.

On August 27, 2007, the State of Nevada Division of Environmental Protection issued a Cease Order against three (3) NTS MLLW generators. The Cease Order alleged that the generators made characterization and/or packaging errors within their approved waste streams.

One of the impacted generators processes waste for several different DOE site offices; therefore, the Cease Order impacted almost all the individually approved NTS generator sites. As a result of these errors, there was a minimal delay of one and a half months for several generator sites MLLW disposal programs; a yet-to-be-determined cost to DOE; loss of incentive fees to DOE contractors, and; an irreparable loss of trust between the State of Nevada Division of Environmental Protection and DOE.

The DOE Environmental Management Office of Disposal Operations (EM-12) conducted audits of the three (3) generators as part of a DOE/State of Nevada Division of Environmental Protection agreed action plan. The Cease Order will not be lifted until all action items are completed and findings closed.

Policy on Compliance with Radioactive Waste Acceptance Requirements

As a result of the Cease Order, the DOE Assistant Secretary for EM issued a new policy on September 12, 2007, entitled *Compliance with Radioactive Waste Acceptance Requirements*. Specifically, it states that ". . . any LLW or MLLW shipment sent to a DOE facility for treatment, storage, or disposal which does not comply with the receiving site's waste acceptance criteria, will be not be accepted for processing and/or disposal. Rather, the generating site or program will be responsible for the timely return transport of the container(s) to the generator site." It further explains that the disposal facilities will no longer facilitate correcting errors for the generators.

EM-12 presented the policy at the NTS Generators Fall Meeting. Immediately, generators

proposed hypothetical scenarios outside of their control (e.g., a label blows off during transportation) as potential problems with the policy. However, EM Headquarters and the NNSA/NSO continue to stress the non-existence of minor errors and that fixing them are the responsibility of the generator.

Avoiding the Nevada Metropolitan Areas

The Nevada Test Site Waste Acceptance Criteria (NTSWAC) requires absolute avoidance of shipping LLW/MLLW over Hoover Dam and Davis Dam, and the Las Vegas Metropolitan Area (see Figure 1 for the approved and prohibited routes). The State of Nevada has recently asked that the Reno Metropolitan Area be added to the list. This change will be incorporated into the NTSWAC.

Since requesting the route avoidance in 2000, prohibited routes have only been used 14 times. Three (3) shipments were approved to use the routes but 11 drivers failed to follow the generator's avoidance directions. The latest incident, which occurred during the EM-12 audits to resolve the Cease Order, prompted DOE Headquarters and motor carrier action.

The DOE Office of Safety Management and Operations, Transportation issued a policy letter on October 1, 2007 reiterating that the improper routing of property can lead to temporary nonuse, suspension and disbarment of the motor carrier.

Additionally some of the drivers who failed to follow generator requirements were terminated and trucking companies were suspended for 30 days. The generator's radioactive waste disposal program was also suspended, causing missed fiscal year 2007 disposal milestones and yet to be determined costs to DOE.

Figure 1. Approved and prohibited routes through the Las Vegas Metropolitan Area

NTS Eligibility Requirements

The NNSA/NSO has developed a comprehensive eligibility determination process for new generators requesting LLW disposal at the NTS. This process is applicable to facilities not owned and/or operated by DOE or its direct contractors – including projects involving other federal agencies, their direct contractors, or private organizations.

The generator is required to submit relevant background and waste stream information to the NNSA/NSO for evaluation. The evaluation identifies if a DOE nexus exists regarding the waste. A checklist is used to document and evaluate the information supporting the generator's contention that the waste(s) resulted from DOE-conducted or DOE-sponsored activities. The evaluation may require the concurrence from the NNSA/NSO legal counsel.

If the eligibility determination is favorable, NNSA/NSO forwards a recommendation to EM-12 for approval. The generator is advised that NTS disposal is authorized, but subject to meeting all applicable requirements of the NTSWAC.

This system of evaluation will ensure proper decisions and nexus connections are documented.

DIRECT FUNDING

In late 2006, the DOE recognized that the generator fee based LLW disposal program needed revision. The change was necessary since larger sites were closing and LLW disposal volumes were rapidly dropping. This drop caused NTS disposal fees to increase. The remaining generators faced with a higher fee dropped their disposal volume forecasts starting a cyclical downward spiral.

After evaluating many options, the DOE decided to direct fund LLW/MLLW disposal at the NTS starting in fiscal year 2008. The funding for up-to 42,475 cubic meters (1.5 million cubic feet) of LLW constitutes the amount one crew can dispose in one year. (**Note:** the NTS can only dispose a total of 20,000 cubic meters [706,000 cubic feet] of MLLW in the Mixed Waste Disposal Unit).

Although direct funded, generators will still need to make cost/benefit decisions when determining disposal options. DOE Headquarters has directed generators to use the unit disposal cost of $14.51 per cubic foot in their analyses. Since the NNSA/NSO must recover the cost of "Work-for-Others" disposal, these generators add an additional 7.5 percent to the unit cost when comparing disposal option costs. The direct funding will bring stability to the costs and operations of the NTS.

Efficiency Volumes

In the past, generators paid for their forecasted disposal volumes 30 days after appropriations were approved. If a generator needed to increase or decrease their disposal volume, they could trade within the NTS generator community. Because of direct funding and fiscal year 2008 forecasts being below the 42,475 cubic meters (1.5 million cubic feet), generators no longer need to trade NTS disposal volumes.

ONGOING ACTIONS

Transuranic (TRU) Waste Federal Review Group (TFRG) Review of the TRU in Trench Special Analysis

In 1986, the NNSA/NSO inadvertently buried 102, 55-gallon drums of classified TRU waste from Rocky Flats in a shallow land burial trench. The NNSA/NSO has developed a TRU in the Trench Special Analysis (SA) to the Performance Assessment to evaluate if the disposal configuration meets the Title 40 Code of Federal Regulations (CFR), Part 191, *Environmental Radiation Protection Standard for Management and Disposal of* Spent *Nuclear Fuel, High-Level, and Transuranic Radioactive Wastes* requirements for TRU waste. The TFRG is scheduled to review the SA in the second quarter of fiscal year 2008. It is anticipated that the disposal configuration will be accepted by the review group.

Land Withdrawal Issue

Since 1994, the State of Nevada has alleged that the specific intended use of the NTS administrative land withdrawals was for weapons testing only and does not include off-site LLW disposal. On June 29, 2007, a senior U.S. Senator for Nevada requested the DOE Secretary to resolve the land withdrawal issue before accepting radioactive waste from a potential NTS generator. The Deputy Assistant Secretary for Regulatory Compliance has started to prepare a legislative proposal to address this issue.

NNSA/NSO National Environmental Policy Act Supplement Analysis

NNSA/NSO is currently evaluating the *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada* (NTS EIS), in accordance with U.S. Department of Energy *National Environmental Policy Act Implementing Procedures* at 10 CFR 1021. The evaluation will determine if current and reasonably foreseeable activities at the NTS are adequately addressed by the NTS EIS. The evaluation will be documented in a Supplement Analysis, as required by 10 CFR 1021.330(d). As part of this evaluation, NNSA/NSO is collecting and reviewing LLW and MLLW forecasts for existing and potential generators. The critical information is the estimated potential volume and anticipated number of shipments for each waste stream during the next five (5) years. The Draft Supplement Analysis is scheduled for public review and comment in January 2008. Although it is not required by DOE procedures, NNSA/NSO is providing the public review and comment to assure stakeholders and interested parties that the process is transparent and technically adequate. Following the public comment period the document will be revised, as necessary, and a Final Supplement Analysis will be published in mid-2008.

CONCLUSION

Changes to the operations, policies, and procedures of waste disposal at the NTS have greatly benefited the generator community while still maintaining stakeholder and public confidence. The NTS has the disposal capacity to meet DOE LLW needs and will continue to meet the MLLW disposal needs until December 1, 2010. Funding method changes will ensure NTS disposal availability for the long-term needs of the complex.

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